



INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI  
SHORT ABSTRACT OF THESIS

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The advancements in the Internet technologies, changed the service delivery model from in house delivery to delivery through Cloud. This cost effective service delivery created a greater demand for cloud and thus the cloud infrastructure. The major cloud service providers such as Google, IBM, Microsoft use data centers as central resource for their cloud computing. Therefore, data center is defined as a central repository of computing, storage and networking for storing and processing large data and information that can be accessed globally. With data center hosting millions of servers, it faces challenges such as reliability, availability, maintainability and safety. One of the major challenges in the design of data center is to combine very large number of servers into a single network fabric called data center network (DCN) and design protocols that addresses the growing needs of data centers.

The major advantages in the design of protocols for DCNs are due the proprietorship of data centers. Since, data centers are private, they can have more controlled structure for the DCNs and often does not face interoperability problem. This leads to many designs proposed for DCNs addressing various aspects of data centers.

In our first contribution, we propose a new architecture for DCN called 4-4, 1-4, based on IP address hierarchy to overcome the short comings in the earlier location based routing. In our second contribution we studied performance of 4-4, 1-4 for energy efficiency. In third contribution we proposed packet scheduler for meeting the dealines for the flows. In fourth and last contribution we proposed a redesign of modular data center networks for efficiency.